REMARKS/ARGUMENTS

The Examiner is thanked for the Office Action mailed November 15, 2007. The status of the application is as follows:

- Claims 1-20 are pending, claim 9 has been amended, and claims 15-20 have been added;
- Claim 9 is rejected under 35 U.S.C. 101;
- Claims 1, 3-10 and 12-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Grangeat et al. ("Theoretical Framework for a Dynamic Cone-Beam Reconstruction Algorithm on a Dynamic Particle Model," 17 July 2002, Phys. Med. Biol., 47 pages 2611-2625) in view of Kachelriess et al. ("Kymogram Detection and Kymogram-Correlated Image Reconstruction from Subsecond Spiral Computed Tomography Scans of the Heart," July 2002, Med. Phys., Volume 29, Number 7, pages 1489-1503) and Cesmeli (US 6,343,215); and
- Claims 1-2 and 4-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Grangeat et al. in view of Kachelriess et al. and Ebrahimifard et al. (US 6,396,897).

The rejections are discussed below.

The Rejection under 35 U.S.C. 101

Claim 9 stands rejected under 35 U.S.C. 101 is being directed to non-statutory subject matter. In particular, the Office asserts that claim 9 is drawn to a computer program, which is an abstract set of instructions and not a physical thing nor a process as they are not "acts" being performed. This rejection should be withdrawn as claim 9 has been amended herein to be directed towards statutory subject matter.

The Rejection of Claims 1, 3-10 and 12-14 under 35 U.S.C. 103(a)

Claims 1, 3-10 and 12-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Grangeat et al. in view of Kachelriess et al. and Cesmeli. This rejection should be withdrawn because the combination of Grangeat et al., Kachelriess et al. and Cesmeli does not teach or suggest all the limitations of the subject claims and, therefore, the combination of Grangeat et al., Kachelriess et al. and Cesmeli fails to establish a *prima facie* case of obvious with respect to the subject claims.

> To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, (CCPA 1974). MPEP §2143.03.

Independent **claim 1** is directed towards a computer tomography method. The method includes, *inter alia*, reconstructing a spatial distribution of the absorption of the periodically moving object from the measured values with the aid of the recorded periodic movement of the object. The reconstructing including: a) determining the spatial area taken up by the object in the examination area; b) subjecting the measured values to parallel rebinning in order to form a number of groups, where the beams corresponding to the measured values of each group form beam fans which lie in planes that are parallel to one another and to the axis of rotation; and c) determining for each group a measured value whose beam irradiates the spatial area taken up by the object, and allocating to the respective group the point in time at which this measured value was acquired. The combination of Grangeat et al., Kachelriess et al. and Cesmeli does not teach or suggest at least these claim aspects.

The Office asserts that Grangeat et al. teaches step c) at pages 2618-2120, Section 4.1.3.2 and, in particular, the cartoon like step-by-step motion. However, the referenced section of Grangeat et al. does not teach or suggest step c). More particularly, Grangeat et al. relates to dynamic cone-beam reconstruction algorithms for reconstructing three-dimensional (3D) image sequences on dynamic 3D CT by combining multi-row two-dimensional (2D) detectors and sub-second scanners. As noted in Grangeat et al., speeding up the rotating gantry allows for the improvement of the temporal resolution of the image sequence, but at the same time, it implies an increase in the dose delivered during a given time period to keep constant the signal-to-noise ratio associated with each frame. To this end, Grangeat et al. proposes an alternative solution to process data on several half-turns in order to reduce the dose delivered per rotation with the same signal-to-noise ratio. To compensate for time evolution and motion artifact, Grangeat et al. proposes to use a dynamic particle model to describe the object evolution during the scan. (See Section 4.1).

Sections 4.1.1, 4.1.1.1 and 4.1.1.2 of Grangeat et al. discuss the sliding window principle for a discrete set of fan-parallel angles. As disclosed, the sliding window principle states that a new frame is computed for each new time value. This new from corresponds to a shift of the

angel between the x-ray source and the origin of a cone-beam coordinate system, and an associated shift of the fan parallel projection sliding window by the angular step between two reconstructed frames. In Section 4.1.2, the parallel projection angular range is split into elementary projection blocks, and a partial block backprojection is described. Section 4.1.3.1 discusses the continuous case when applying dynamic evolution compensation. For this case, a first-order predication model is derived and related to a first-order approximation. In Section 4.1.3.2, Grangeat et al. states that implementing the continuous case would require computation of the regression coefficients for each projection angle, which would be too time consuming. To that end, Grangeat et al. proposes a cartoon-like step-by-step approach in which it is assumed that no dynamic evolution takes places during the time period associated with each block. Under this assumption, Grangeat et al. discloses a partial block backprojection technique in which it is assumed that a trajectory is piecewise constant on a time interval $[t_{id}, t_{if}]$.

In summary, Grangeat et al. discloses a technique in which fan-parallel angels are split into blocks and, for each block, it is assumed that no dynamic evolution takes places during a time period in order to reduce the amount of block backprojection time by eliminating the need to compute regression coefficients for each projection angle. Hence, Grangeat et al. does not teach or suggest determining for each group a measured value whose beam irradiates the spatial area taken up by the object, and allocating to the respective group the point in time at which this measured value was acquired. Rather than allocating a point in time to each group of parallel rebinned measured values for reconstruction, Grangeat et al. teaches that each block of fan-parallel projections is referenced to a plurality times in the time interval $[t_{id}, t_{if}]$.

In view of the foregoing, it is readily apparent that Grangeat et al. does not teach or suggest each and every claim aspect recited in claim 1. Accordingly, this rejection of claims 1 should be withdrawn.

Claim 3, which depends from claim 1, recites that in step c) the geometric center of the spatial area taken up by the object in the examination area is determined and for each group a measured value is determined whose beam runs through the geometric center, where the point in time at which this measured value was acquired is allocated to the respective group. The Office references column 5, lines 48-52, of Cesmeli to teach this claim aspect. Contrary to this assertion, column 5, lines 48-52, of Cesmeli states that the final reconstructed images are

centered on a region of motion such as that heart. However, Cesmeli is silent regarding determining a "geometric" center of the region of motion. As such, the combination of Grangeat et al. and Cesmeli does not teach or suggest the subject claim aspects.

Independent **claims 10 and 14** recite aspects similar to those recited in claim 1. As such, the discussion above regarding claim 1 applies mutatis mutandis to independent claims 10 and 14.

Claims 4-9 and 11-13 respectively depend from claims 1 and 10 and are allowable at least by virtue of their dependencies.

The Rejection of Claims 1-2 and 4-13 under 35 U.S.C. 103(a)

Claims 1-2 and 4-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Grangeat et al. in view of Kachelriess et al. and Ebrahimifard et al.

The above-discussion regarding independent **claims 1, 10 and 14** and step c) also applies here. That is, Grangeat et al. does not teach or suggest step c). In addition, neither Kachelriess et al., Ebrahimifard et al. nor the combination thereof make up for the deficiencies of Grangeat et al. with respect to independent claims 1, 10 and 14. Accordingly, the rejection of claims 1, 10 and 14 should be withdrawn.

Claims 2, 4-9 and 11-13 depend from claims 1 and 10 and are allowable at least by virtue of their dependencies.

New Claims 15-20

Newly added claims 15-20 emphasize various aspects. No new matter has been added.

Claim 15, which depends from claim 1, recites that in step c), the measured value for each group corresponds to a beam fan that irradiates the geometric center of the spatial area taken up by the object in the examination area. As noted *supra*, the art of record relied upon is silent regarding the "geometric" center. At most, Cesmeli discloses centering images on a region of motion, and not beam fans with respect to a "geometric" center of the spatial area taken up by the object in the examination area.

Claim 16, which depends from claim 3, recites that the geometric center is a center of gravity of the spatial area taken up by the object in the examination area. **Claim 17**, which

depends from claim 14, and **Claim 18**, which depends from claim 10, recite that in step c), the measured value for each group corresponds to a beam fan that irradiates a center of gravity of the spatial area taken up by the object in the examination area. The art of record relied upon does not teach or suggest such aspects

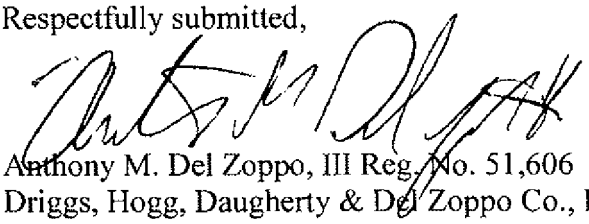
Claim 19, which depends from claim 10, recites that a time interval between the point in time and an acquisition time of each measured value is such that the reconstruction does not use measured values whose beams were acquired at points in time which lie outside a predefined time range. **Claim 20**, which depends from claim 10, recites that a time interval between the point in time and an acquisition time of each measured value is such that the reconstruction does not use measured values whose beams do not come into contact with the object. Such aspects are absent from the art of record relied upon.

Entry and allowance of claims 15-20 is respectfully requested.

Conclusion

In view of the foregoing, it is submitted that the claims distinguish patentably and non-obviously over the prior art of record. An early indication of allowability is earnestly solicited.

Respectfully submitted,



Anthony M. Del Zoppo, III Reg. No. 51,606
Driggs, Hogg, Daugherty & Del Zoppo Co., L.P.A.
38500 Chardon Road
Willoughby Hills, Ohio 44094
Phone: 1.440.391.5100
Fax: 1.440.391.5101

Direct all correspondence to:
Thomas M. Lundin, Reg. No. 48,979
Philips Intellectual Property & Standards
595 Miner Road
Cleveland, Ohio 44143
Phone: 440.483.4281
Fax: 440.483.2452